Notebook, N-90-01-04.6

This notebook was begun in January 1890. All entries are by Edison. The book contains notes, drawings, and calculations relating to ore milling, including cost estimates based upon labor and energy requirements for separating iron, copper, and nickel ores from the Sudbury mining region. There are also notes regarding the testing of numerous chemical compounds for potential use in incandescent lamp filaments or phonograph cylinders. Edison's notations indicate that he assigned many of these chemical tests to an experimenter named "Joe," possibly John Joseph Force. The front cover is labeled "584." The inside front cover is inscribed "584 T. A. Edison Jan 4. 90." The pages are unnumbered, and at least one page has been removed from the back of the book. Approximately 130 pages have been used.

90-01-04.6

584

Sa. Edison

Sa 4.90

64 85

10 — 40

44

.5 volt.

44
176

32

44
50
2200

32 amp —

1/400 of ohm

44 —

32
44
128
128
1408

40) 1296 (32.
120
96
96
16

400 —

750 ft lb

11 ft lb.
400
4400 —

1½ hp

32 —

1. 44
2 176
4. 704
8 2816
16 11264
32. 45056

8 ohms — 3 sq inches.

3 ohms per sq inch = .55 volt.

144
9
296 —

1	3
2	1.500
4	.750
8	.375
16	.188
32	.094
64	.047
128	.0235
256	.01175
512	.00562
1024	.00281 ohm

15

½ hp — 1½ hp
per hour
1½ lb
1 lb per ½ hp

32 amp — 37

.5 on .5 ohm

11 ft lb
1
2
4
8
16

44
176
704
2816
11224
44896

32
176
704
2816
11264
45056

1½ hp —

300
240 openhen

1 amp

240 400 amp
1200

1 volt 1 ohm 44
400
17600

24 kwh per day per
100 hp per hr.
1200 hp

25 6000
750000

2

400 | 10000 - 23 -
8000
5000

75000
27000
10000
8000
120000 72

25 - 6
12 - 3
9

120 tons 32 400 mnp.

800 Lights.
64 | 1200 | 18
640
560
512

30 7
158
35 - 12

3000 hp Trip Expn -

@25 per hp -	75000
@9 per hp boiler	27000
Bldg -	15000
pumps, piping etc	10000 -
Dynamos -	54000
Belt shafting	10000
Wiring -	12000
Units -	25000
Crane -	5000
Cast Metals -	2000
Rosetta & Silvia -	15000
Water piping etc -	5000
	255000 -
Vat House	20000
	275000
	~~120000~~ 2
	450000

1 million gallons

24 | 1.300 | 120 | 190 | 480 | 24 | 160 | 144 | 160 | 160

20000 | 480 burn | 960000 | 24

amp 57160

2000 per year

320 | 2000 | 1920 | 80

24 | 2000 | 48 | 16 | 320 | 48 | 100.

320 | 20 | 6400

30 tons daily

6 months

54000. | 1½ | 108000 | 54000 | 81000

11 pounds

24 | 144 | 3000 | 432000 | 16000 | 27000 | 2.

20 per hp per yr.

75000
27000
15000
10000
5000
132.000

117

30

Coal – 3# lbs steele. 50c 4 tons hour.

12. per hour. * 48. 500 | 10 | 16000.

	16000-
12 firem	7500
4 engineer	5000
4 oilers	2400
1 oil	2000
Repairs	7000
grate bars	1000
foreman	1500
Taxes	2000
Chief Engr	4000
Extras	5000

3000 | 53400 | 30000 | 23400 | 21000 | 2400 | 117

3 | 53400 | 16000 | 69400 | 23000 | 92400

40) 650000 (amps
16250
40
250
240
100
80
200
200

16250 - 25 volts.

5

30. 24
3000
480

3 - 15

40 - 4 tons Malle —

10 - 100
200

Coal 32000

Chief Engr - 3000

2 Engr - 25-00 -

2 oilers — 15-00 -

oil 1200

10 firemen 6000

10000

3000) 5620 00 (18.73 -

3000 00

2620 00

2400 00

220 00

60 - 75
2000
1500 00

127500 . 25
250
750
1500
3000

225 . 16000
4
64
38 (3000) 32000 (1

140 –
35 per 6m

50

35
175.00

190
4 760

12

35.00
3.00
105.00

2588 –
2244
896

50000
70000 –
120000
86150
33850
2400
241

280
25
1400
560
700

70.
37.50

75000
37500

14
2000
2800

49
37.50
86.50

280
175
400
160
280
490

280
400
520
1360.00
8471

475
1900

288

365
288
2920
2920
730
105,120

2240 | 120000
112000
40000

5.73

10,000
1,25
12,500

3 1500 | 12000
12000

8.

12
24
48
24
288

32
365
32
730
1095
11680

6000 hp – 24 hours 365 days –

Coal 2 lbs at 2.25	105,000
Chief Engr. –	4,000.
4 Engineers =	6,000.
2 oilers –	1,500.
2 Laborers –	1,200
16 firemen –	10,650
6 Laborers =	3,500
2 firemen foreman –	4,000
grate bars	2,500
Oil	2,500
Repairs =	5,000
240,000 Interest 6pct	14,500
Depr –	9,500
Insurance	1,800
Taxes –	3,000
	174,650

365) 174000 (477
1460
2580
2190
2430

50 tons

200 150 hp for Co Corp

477 (11.9
40
70
40
370

1500) 6000 (4.0
6000
40

365 tons

365) 2330 (6.44
2190
140

75
230
2190

174000 total Cost 6000 hp -

6000) 174000 (29 per hp -
12000
54000
54000

Steam only

	Daily		
Helpers for 200 tons Matte	10 men		20
Nuclers	10		20
Copper strippers	5		10
Roasters	5		10
Strip makers	2		4
Solution men	2		4
pumpers	2		4
Dynamo men + oilers	6		12
~~Oilers~~ Inspectors	2		8
Electrician	2		10
Chief Electrician	1		10
" Chemist	1		20
Chemist	4		10
	Daily		$142

Salaries Continued brought forward 142

Melters of pure Copper	6	12
Brickers of $Mn FeO^3$	6	12
Laborers Leadpile	70	70
Genl Manager	1	30
Coal for roasting		75
~~Assaying~~		

341.
365 days
170 5
204 6
1023
12446 5
145-00
25-00
15-00
9600
10000
162565
174000
336565

240000 — Interest 6

Taxes:
Ins —
Depcn — 4pct.
Repairs —
Electrical
Eng —

931
4
3724

931
3
2793

2) 9.31
4.65
13.96

6000) 365000
360000
5000

68) 8000 (66
720
800
720
80

500000
120

4) 2793
6.98

4) 3724
9.32

365) 34050 (9.31
32850
1150
1095
550

68
150
1020

4) 1862
4.65

4) 1396
3.49

1/3

In round nos
$1000 per day-

~~Over 1m per Cap~~

or $68. per hp per year 24 hours

If 1 ton Cu takes 50 hp per 24 hours Cost then 1 years gives 365 tons per 50 hp - or $ 9.31 per ton with the Fe in bricks or cars - Cu in ingots with interest on unnecessary paid -

		Ton Cu	Ton Matte
If 75 hp required then Cost		1396 -	3.49
If 100 hp	" " "	1862	4.65 -
If 150	" " "	2793	6.98
If 200	" "	3724 -	9.32

75
500
37.50
46.50
86.50

250
175
140
190
380
49.00

12.50

freight from Sudbury - to Orange say
$5 per ton matte - or $20 for the 25 pct
of Copper in Matte.

Matte Cost 86.50.
trt 5.00
91.50.

Cost matte.	91.50
Cost wkg at rate of 75 hp per ton Cu -	3.49
	94.99.
at rate of 100 hp	4.65
	96.15
at 150 -	6.98
	98.48
at 200 —	9.32
	100.52

1680
360
400
800
1008
3000
6132000

13000
65000

613

280
300
840

280
300
400
1600
3000
840

280
300
400
1600
3000
840
560
640

120
140
480
1200
1680

at the worst $100 per ton

500 lbs Cu at. 13 — 65,00
280 lbs Ni at 30c — 84 00
— 149.00

Ni at 25c — Cu 65 00
70 00
135 00.

Cop at 10c — 50.00
Ni at. 23c — 64 40
114 40 —

Lowest profit 14 per ton.

Surplus profits above interest at full Capacity on highest est 200 hp per ton Cu grows 30 tons daily or 120 tons matte at 14 prof 1680 per day. or 613 000 per year = or 150 per div —

8000 tons converted in malts at $8650.

$692 000 – used at rate of 120 tons daily – (200 hp per ton Cu) lasts 66 days say 80 days – $113 per day 6 pct.

9040 for 80 days or $10 per ton malts or 4.40 per ton Copper –

Coal bill 105 000 –

2 lbs per hour per hp at 2.25

If moved where Coal was 12½ saving to 52 500 yearly

Cost per ton malts 105 000 rate for Coal – (200 hp per ton Cu) 2.40 c for Coal

12½ Coal 1.20

56 c Coal .60 c

435000 | 105000 (2.40
84000
21000
17500
3500

8650
8000
692000

113 80
9040

692000

120
365
600
720
360
431 5000

365 | 41360 (113
36500
4860
3650
1210
1095
115

36000
3400
41360

Copper Elect –

Try Alumina Hydrate to form aluminate of Cop or Ni to separate from Fe –

Try Rosin which is Cheap & powerful acid to sep Cop or Ni from Fe

acetal. liquid -
glacial acetic acid. Liquid
acetamide - C_2H_3-NO. solid
melts. 78 boils 221. C.

Acetic Ether

Acetate of allyl. Liquid. (amylac is an alc.)
" " Benzyl -
" " Ethyl.
" " methyl.

Acetonitrile - C_2H_3N - (Cy of methyl)

Hydrate of phenyl - or phenyl alcohol

Cetyl alcohol

Acetic Aldehyde - or Hydride of acetyl - Liquid -

act on oil amber
with Nitric acid
do on amber by
Nitric.

acetic Aldehyde -
Propionic "
Butyric - "
Butyric acid
Formic acid
Benzoic aldehyde - ok
Allyl alcohol
Oil Garlic - or Sulphide of
Allyl — $C_6H_{10}S$.
Allyl Mercaptan. $C_3H_6.S$
Allylamine. C_3H_7N. ok
Oil Almonds ok

Amyl or Fusel Oil ok C_5H_{11}

Hydrate of amyl - $C_5H_{12}O$, ok or Comel Fusel

Hydride of amyl - $C_5H_{11}.H$.

Amylic Ether. Liq - ok

Hydrate of Amylene. or Amylene Glycol

$C_5H_{12}O_2$ ok

Oil anise ok

Amarine - when HCl is poured on amarine Oil formed. which gradly solidifies on drying & may be drawn into threads on heating - it distils without decomp as an oil solidifying to a crystalline mass — Phaneogh, Watts Vol 1 162 -

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In distillation of Amber there is a white substance produced as well as a Bitumen - White sub has 95.6 pct Carbon 6 at H - ~~H~~. it melts Nitrica Resinifies it, Watts Vol 1 162 — Filo

Anchoic acid (fatty) -
Anchoate Ammonium dis water phly non-
Electric. amorphous - Barium Salt.
Transparent films - dried over H_2SO_4 form
white opaque mass like Porcelain -
Watts 1 290 Phenogh.

Anchusin - Coloring Matter of alkanet
root, (Anchusa Tinctoria) amorphous
dont fuse softens gives of iodine like
Vapors at 60 C - & Carbonizes higher temp
dis Ether - Impurities + fixed & dis.
Fils. Watts 290 - Vol 1

Angelica Wax - phenol Watts 1 292

Nitranisic acid. ~~Crystallizes~~
it melts at 180 C. heated further
sublimes - partly blackens & decomposes
Fils. - Vol 1 302

Anisic alcohol. Converted by Sal acid into Resin hard transparent
Phono - Vol I 303 pbly Nq -

Anisal - C_7H_8O - gloss liq

Anisulmin - Brown product from ~~Extracting~~ Anise seed after previous treatment with alcohol, Water + HCl. with aqueous potash + precip alkali by acetic acid - Fils - Vol I 306

Hydride of anisyl pentachlorphos alcohol. thickens it + finally gives black pitchy mass.. Watts Vol I 307
Fils

Annotto = Nitric acid. pitches it - fils
Watts Vol 1 308

Creosote, JOE OB

Asphalt Oil - JOE

Formate of methyl JOE

Ethylamine. C_2H_7N - JOE
Tetrylamine $C_4H_{11}N$ "
Amylamine - $C_5H_{13}N$. "
Octylamine -
phenylamine - C_6H_7N: want the disulph
Ulmic substance its an lime oil & thinde
Cyanide Ethyl
" methyl.
Nitrite amyl - JOE

Camenal ok Joe
Tetryl.
Wood Spirit, ok
phenylic alcohol.

get Sulph of Benzadin in Room 6 that dont melt & find solvent

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Cabonge pea & bean nialonal
see of pub much. & cambesquinto

Di Nitrobenzene - Joe
Benzil — "
Bergmat oil "

Squirt Mushrooms.

Deppels oil — Joe

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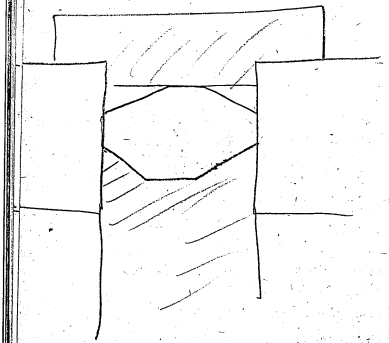
pyridine
Picoline get
Lutidine
Collidines

Liq. in Deppel's Joe



Block cryolalue Compound left in retort Hexaglycerie Bromhydrin.
Fils - Watts 1 668,

Bromaform - have it pass through tube containing amalgamated copper to stop - Effect on Hg of pump 506

Butyric acid 506 IC E

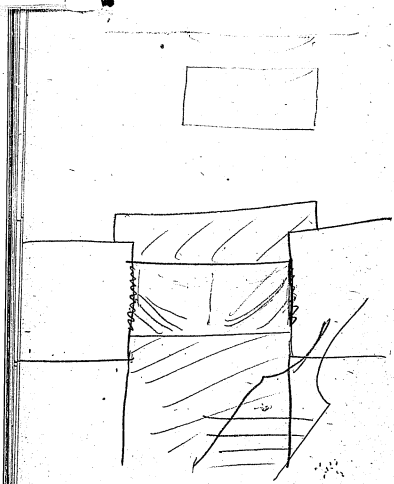
Oil Cajaput. Oil 506

Oil Juniper Oil

Oil Thyme. Oil 506

Camphol - 506

Sexchloro-camphor resembles white wax - phono -
Watts Vol 1 728



~~Wh~~

Camphoramic acid -
melts to transparent vitreous mass
Pharm Watts Vol 1 729

Camphor Resin - a non volatile
Resin due to action Sodium on Camphor
Pharm Fife Watts 730

Camphorone - - Jos.
~~Watts~~ - Liquid -

Oil Cassulchone - Jos.

Caproic acid - Liq - Jos

Capronitrile - Jos Liq

Tetrachloride Carbon Liq -
and Cap in Tube - Ogs.

Bisulphide Carbon - Jot
Lookout for dissolving Rubber.

Cardamon Seed oil Jot

Oil Caraway - Jot Ok

Ceropic acid - waxy mass
phono - Watts 1 836

Cerosin - wax of sugar Cane
very hard. Griffe MP 82 Cent.
Watts 1 836 Phono

Insulation - Chlorinated Cerotene
from Chinese wax Watts 1 836.

Chlorocerotic acid - Chlorinating
cerotic acid from Beeswax. Transparent
gum - phono - Watts 1 837

Ceryl alcohol. gos

Cetraric acid - formation of Ulmic a by H_2SO_4 — Watts 1 839 fil

Cetylsulphate. of potassium not fusible - poly mq fil - watts 1 842 -

Trichloroacetic acid gos
+ for disolvg Carbonate.

Chloral - thin oil - gos
+ for disolvg Carbonate -

Chloralide - dis Carbonate. sol.

Mix Syrian with Iodoform will a fil heated melt, If Iodine Disolved in Chloroform to Syrup or in Turpentine or Bichl Carbon + Syrian Evap cite fil melt, or powdered Iodine + Syrian Just moistened with Chloro or Ether - melt. S _____

Cinnamene - Valilik oil of Liquid storax = Jos

Balsam Peru can be saponified phano - Try all balsams -

Chlorine passed ~~at~~ in diffused daylight over dry Cinnamic acid produces tough greasy substance, phano - Watts 1.984.

Oil Cassia - Jos

Citrate of Magnesium gummy amorphous mass - phano Watts 1 995.

Oil Citron
" Citronella Jos
Oil Cloves

Petroleum polyd used Carbonite.

Comenic acid or Meconic acid
& Comenate - ~~good base~~
for fils - see Watts 1. 1104

Oil Rosemary - Jos

Oil Coriander seed Jos

Oil Cress -

Cumol Jos or Cuminal

Cyanide of ammonia -
deposit ~~Algulmic acid~~ Jos

Cyanide of Ethyl - propionitrile for
w/ Hydrocyanic Ether,
very poisonous

Cyclamin - may be good for piles
Watts Vol 2 794.

Furfural - for Leg

Oil Wintergreen for

Gentianic acid Carbs
without much dreamy W 2 830

Glycocine - can be carbs before
much dreamy - W 2 902

Haematoxylin - from Logwood - we have
some Conc Extract solid - Sal alcohol -
good for gas - also possibly Extract
an amorphous stuff against piles -
Try Benzene to dissolve out anything not
amorphous - Watts 3 - p 4

Haematoxylin has many reactions & is good base for Sgt fils — see Watts

Benzine - Naptha, Regolene, 708 - Emmons

Heat ~~[illegible]~~ Diphenylamine in side tube - Emmons

Hydroquinone - Watts III. 213 fil
do 2141

Imaoatin. Watts III 245 - fil
Indifuscin - dont fuse Watts III 249

Common indigo - fils
Sulphendigotic acid - fils
Watts 259 - Vol 3

Indehumin - Watts 3 264 fil

Japonic acid $C_{12}H_{10}O_5$ - the blackstuff which produced by exposing Catechin in Caustic Pot. Help throw it down. Its sol water & sol alcohol Watts 3 442 fab.

Legumin - brown chrome Chrom - gas dip - Vol III 569

Litmus - base for soft fab Azolitmin

Luteolin Residue fab soft Vol III 736

Malate of Lead phosphor Vol III p796. 797 amorp - basic salt under crystalline.

Melamine acid resembles dampblack very sol alcohol ether & alkaline leads - perhaps good for soft fab - Vol III 867

Melassic acid - black - action of Heat on Caustic alkalis & glucose - Soluble in alcohol ? - Sgt fils Coll 3 868

Melene - ~~[illegible]~~ Sgt fils III. 868

Methulmic acid - base for Sgt fils Vol III 983-84

Moric acid dec without melg Vol III 1048 Sal al

Murexan dont fuse Sgt fils Sal alkalis III 1063

Oleamide - phno Vol 4 191

Peatic acid sgt file Vol 4 367

Hxmelaphosphate of Lead

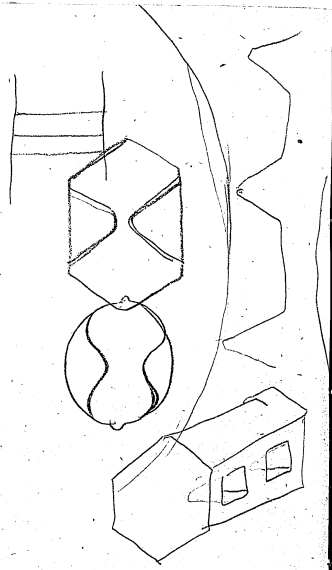
a Resin - phono - 4 566

Use phos anhydride for Dryer
+ put dry CyofK in side tube -
+ heat when ready flash - Emmons

Try Sleanals Aniline phono

Oxdge paraffine oil with hot nitric
for a fil bulumen —

Uranine - JOE & fels
Fluorescene, " "
Thallene " "



Physalin - Vol 4 - 634 - 7 lbs

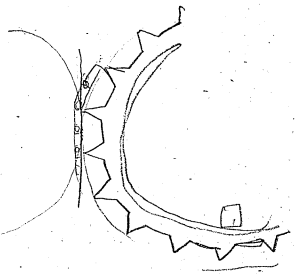
Picolin - goes - flesh - all the CHN. Legumes to be used

Stearic acid pitch - black stuff boil down to a very thick asphalt. Then dissolve + ~~used for~~ dip fils - all CHN's poly

Try this stuff with Na hot to make a solid for phono

Picolin Chloride - Vol 4 638
phenol insol H_2O -

All the solid medicinal
Extracts - see MCKTR Catalogue
most are amorphous by
Carbon direct analysis of
dried of C_{20} fuls, from the
crude drugs
If they such as show semi
fusion showing $C_{20}H$ - by
separation by solvents the too
Easily fusible material =
planchy matter =



Picrotoxin Dreumpiwilliant
fusion fols 643 val 4 –
Cocculus Indicus.

Picryl – fols 644 Val 4

Nitromane or Azomane acid
Carbo nitrail. Nitrate.
action Nita on Pimaric acid
from Gallipot.

Piperic acid fols – 654 – Val 4

Piperidine a $C_5H_{11}N$ liq –
Watts 4 655 – fleas. –

Propionitrile - flash - Vol 4 736,
CHN or cyanide ethyl -

Pseudoveratrine - dip - Vol 4 745

Urates of the CHNs = say
Urate of Aniline - for dip -

Alloxan - dip -
Murexide - good dip

Alizarin
Purpurin Watts 4750

Puree a Comd Color - a CHN,
Watts 751 - 4 Vol

Pyridine CHN - Vol 4 754
flash -

Chlorine Bromine & Iodine
act on the CHN Liquids to
give salts & perhaps many
will be valuable & good for
dyes or sgpt fils,

Pyrolartrimide combined
with Oxide Lead - gelatanizes
paper - $C_5H_7NO_2$ = thread
fils & other uses Insulation -
Wells 77s - Val 4

Pyrotartranilic acid fils.
Val 4 77s -

Pyrral CHN - flash -
Pyral Red - Val 4 78.4 fil
dyes sgpt -

Carbohydrates treated with ammonia take up N
gravegelatanous deposits.
Dusart by heating glucose,
Milk sugar with aqueous
ammonia obtained nitrogenous
product which precip by
Alcohol in Tennacious Brown
fils; Val 5 467

Only Copying marks
in 4th Val & Chemical
on — without nereadily

Verantin fils Val 5 995
do Halogen Compds & Nitrate

Viscin - arabic residue -
good base = fils Val 5 1003

aceldulmic acid Vol 6 29 –

Terephthalic acid (Kenyneelly Tall) not fusible

Hydroxyterephthalic acid not fusible –

Umbelliferone not fusible.
$C_9H_6O_3$

Cholecamphonic acid not fusible –

Naphthalene-dicarboxylic acid – not fusible.
$C_{12}H_8O_4$.

Hexahydroxydiphenylene Ketone – decomp without Melting

Anthraflavic acid non fusible

Tetrahydroxyanthraquinone, non fusible

Anthrachrysone "

Anthral, a " "

Diphenic acid (150) – one of them infusible –

Tetrahydroxybenzoic acid non fusible

Benzoylbenzoylphthalic acid "

Aurin – "

Phloroglucolphthalein "

Anamirtin – "

Resorcinophthalein – "

(Fluoresorcein)

Metaphloretin – "

Catechin-Tetrahydride "

" Dihydride "

CHNS –

Formoguanamine – nonfus.

Anhydroformaldehydaniline "

Dianthramine "

Dipheranthranazolide – "

Perchlorbrophenylamine – "
$C_6Cl_5-Br_3N$ –

~~Scop~~ Acolytine.
for file – from Henbane
Extract, Vol 6. 54.

Acrolein-Combines with
aniline from amorphous case
Vol 6 56 —

Flashing —

Acetonitril, (Methylic Cyanide)
CH_3CN. good — Liq —

Propionitril, Ethylic Cyanide.

Isopropylamine —
Propylamine.
Ethylic Cyanide.
Diethylamine —
Butylamine.
Isobutylamine.
Pyridine.
Pyrrol
Piperidine
Amylamine.
Picoline.
Benzonitril.
Parvoline for Dippel's oil
Naphthalamine. a salt

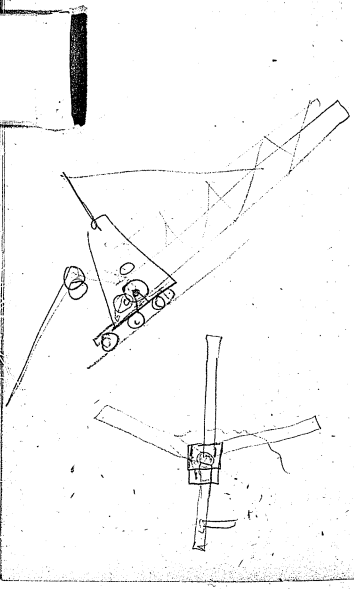
get Schuchardt's Frommsdorf's
menks Cal alcohol & get all
the CH No —

Have Atwood try
Napthalene as Lubricant

Napthalene dissolves
Sulphides of Antimony & Tin
Iodide Hg Oxalic Succinic
+ Benzoic acids — try
these for strength cylinders

Hot Phenol is great solvent
for Organic insoluble substances

Quinone $C_6H_4O_2$ this stuff deposits
brown sub Exposed air Especially if
alkalized something in this group for
film — ~~Arthur~~



Mellors Chem =

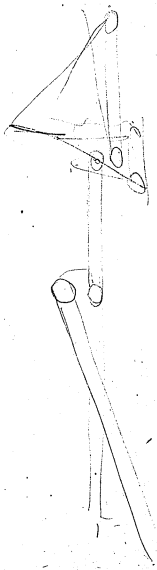
p 712. (1617) Ethylenic Sulphide C_2H_4S. So p 713 all amorphous. action of a-dibromethane or Ethyl bromide on Alcoholic Solution Potassic Sulphide which amorphous substance

Methyl Iodide + propyl bromide treated with alcoholic Pot sulphide - gives amorphous sulphide insoluble in all neutral solvents

fits + phono

Dinitroanthraquinone - or Fritzsches Reagents - Combines with all known solid Hydrobns in Coal Tar = action of Dilute Nitric acid on anthracene. for phono to get rid of Crystalizn

Try Dippel Oil Solvent Carbonate



after acting in Carbon tetrachl
methyl alcohol – try other stuff
Salicylic, to get out all pufy stuff.

Metacinnamene polymerized
by heating in sealed tubes to
392 7 amorphous Calorlessness
solid high refracting power
dissolubile smaller taste –
quite transparent applies on
applen heat. Drawn out in
threads – Make some for
phenos – Insulation – +
physical Experiments,
B-Dinitro anthraquinone filts
with 1st vol 3rd sup 99 –
action of nitric Acid on a
phenol – a Resin phenol
for mixing –

Alcoholic Solutions of Caustic Soda or potash produce lively action on Dinitrobenzene [black] amorphous substances formed which are partially soluble in alkalies — Watts [1st Vol 3rd Dup 175 —

Action of Antimony Trichlor on Azobenzene is converted into black amorphous substance, having Conchoidal fracture Metallic Lustre Sol. in Water more Easily in Alcohol.
Watts, [1st Vol 3rd] Dup 212

Melamidobenzenesulphonic acid
melts without ~~Dbn~~ ~~Dbn~~
amt this Sulphanilic acid
Sulphydrohotwater. 1st Dbl 3rd Sup
p 227
See 228 Diamidobenzenesulphonic Acid

Dibromomelamidobenzenesulphonic acid
Dont fuse. 1st Dbl 3rd Sup 232
also 233 Amidogenedibromobenzenesulphonic

1st Vol 3rd Sup

Tribromomelamidobenzenesulphonic A
p 234. Dont fuse

Tetrabromomelamidobenzenesulphonic A
234 Dont fuse

Tetrabromamidobenzenesulphonic A
234 Dont fuse

Dimethylaniline sulfonic 235 1st 3rd
Dont fuse

Amide of Tribromobenzenesulfonic acid
241 1st 3rd – Dont fuse

Amide of Tetratromobenzenesulfonic acid
1st 3rd 243 244 Dont fuse
Sol alcohol easily.

~~Cl~~ Amide Pentatromobenzenesulfonic
~~Dont fuse~~
1st 3rd 244 sol alcohol
245 – Nitrodibromo ditto

There are a lot of these
Sulphonic acid Benzenes
that dont melt / distribed
in 1st 3rd

Thiocarbamidobenzoic acid
fils & phono — 30 lines down
and then Compound —
1st 3rd 269

Azoxybenzoic acid
not fuse
1st 3rd 277

Diazoxybenzoic acid good —
p 277 278, 1st 3rd,
just like Melissic or azulmic
acid sal in ammonia
ammonium salt dries to a
varnish brown transparent
See Barium salt most elastic stab known
jumps in cloth for hours
also Atlas-Monomiro diazoxy benzoic

See Carbon Hydrate from Cast iron action Nitric acid leaves soluble m.it = fels, 1st 3rd 405

Chrysean 1st 3rd 463

Benzenyl - imidoxim - Carbonyl.
Dont fuse.

Carboxy-benzenyl - azoxim, propanyl.
Carboxylic acid - Dont fuse -

Watts New Dic Vol 1 424

Dont forget to dip fil in a Carbon Compound of lime or Magnesium to produce a semi- or non candely surface on fil to prevent Gyscler action,

Chlorine passed in diffused daylight over dry Cinnamic acid forms a tough greasy substance Watts 1st Suppl 984 –

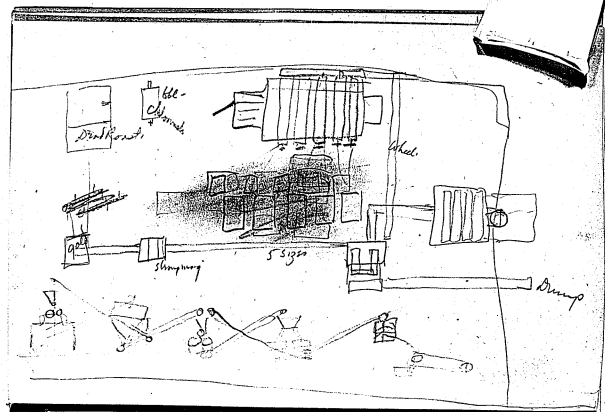
Citrate of Lithium phos } g
Magnesium phos } ~~g~~
Nickel phos }

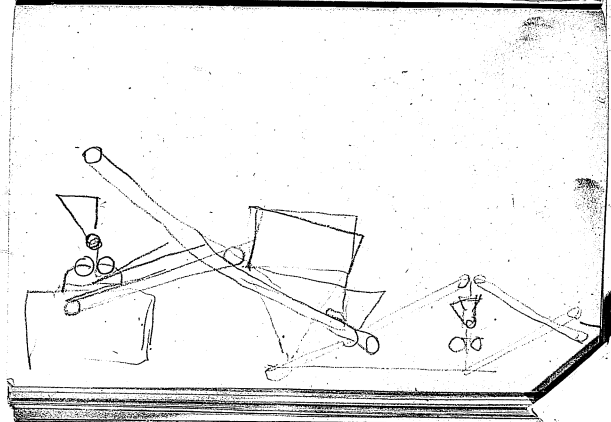
Di Potassic Citrate acid – prevent Electrofocalism phos –
See Vol 1 999 – Watts – also Insoluble Phos
1001 – 1002 1004 –

Acrylic aldehyde formaso alid with Amorphous Compound with Ammonia Vol 1 112

Alkophosphate Glycerylphosphoric Watts 1 p 134

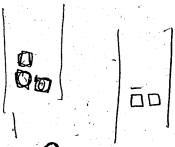
Amylic alcohol action of Sal acid
phrmo - Watts Val I 303 + chez
Ariautman filo Val I 306 -
Arachidic acid - like porcelain
phrmo - Val I 353 See 354
" soap made in France


Wheel.
Stamping
5 Sizes
Dump



45
31
45
135
1395

1395
2240
~~845~~



800 lbs –

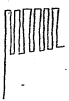
380 lbs from orig

31
20
620

2240
620
1620 – $4\frac{1}{2}$
380 –
1220 – $2\frac{1}{2}$

31
4
124
16
140

140 lbs per ton – 23 lbs –
75 " " per ton – 41
64. 2 unit



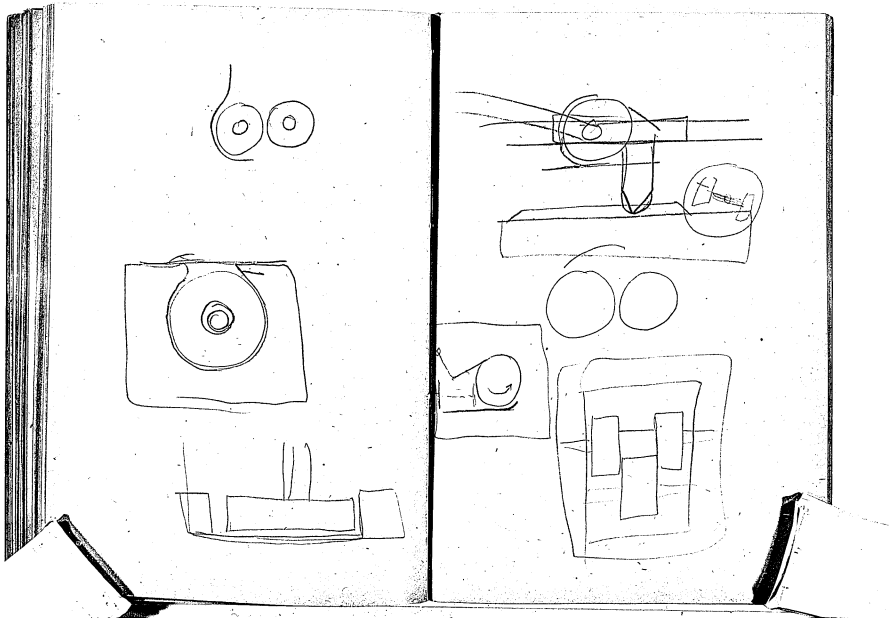
17
33
50
118

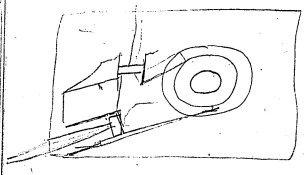
16) 380 (23
32
60

140) 2240 (16. lbs to lb
140
840
84

75) 2240 (29 8
20
1500
~~1500~~
740
675
650.

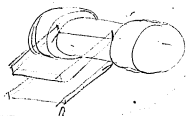
30 lb) 1220 ($40\frac{1}{2}$
120
20





Pot Na

Ca cl-



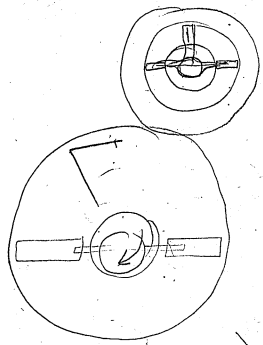
Pos Na - Ca Cl -

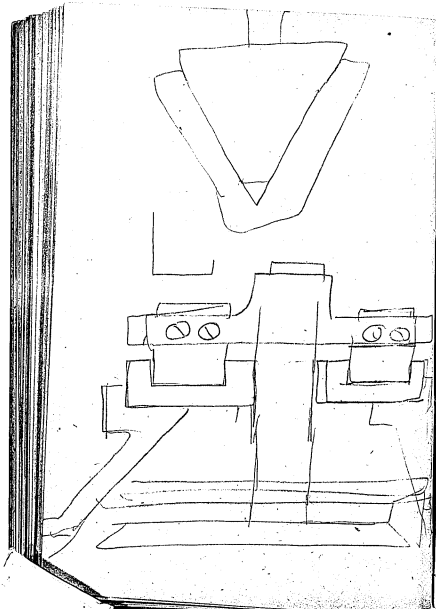
Na cl - Kos Ca

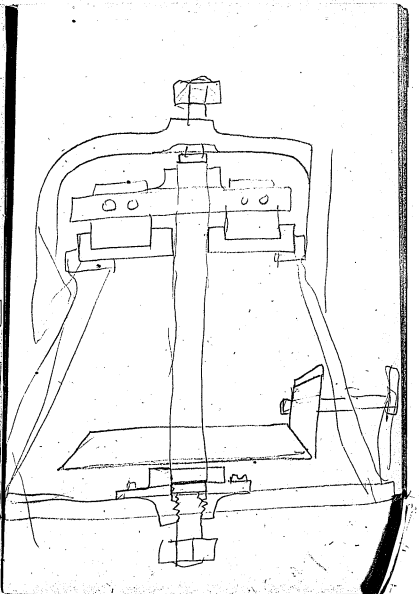
SO4 Na - Hcl Ca - Ca cl -

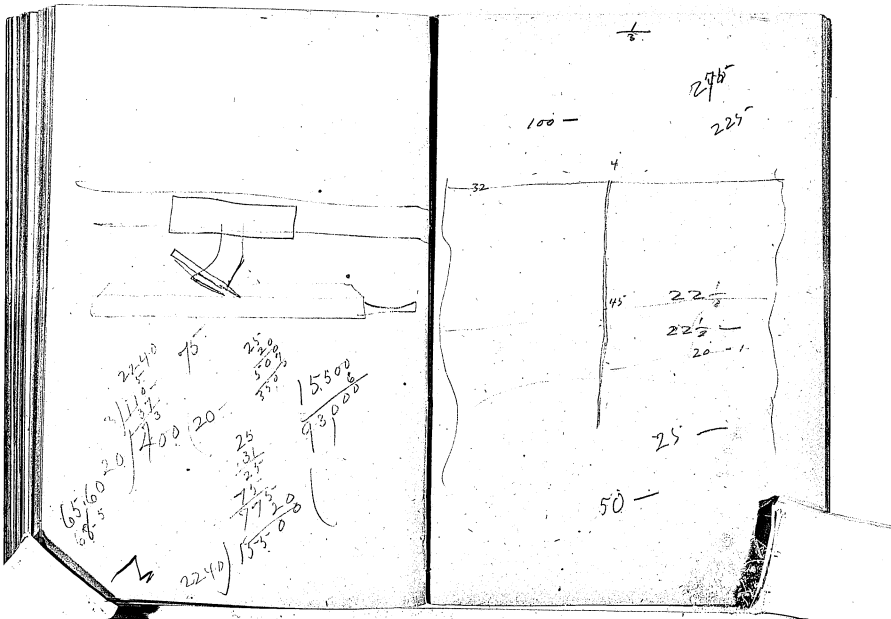
Ca - Cu SO4 - Na

SO4 Na









135 tons hour

336 0 8 day

60 tons

1382 4 00

55 2 81

1382

500

88.3

2646

44 tons

55 - 33

20 | 2646 (132

20

64

60

46

1382

5

4000

20

55 | 8000 (1454

55

250

220

300

275

250

220

138 2

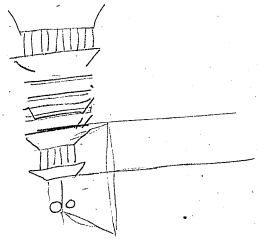
55 | 4000 (72

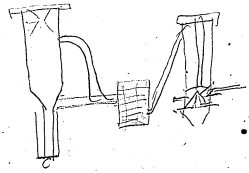
385

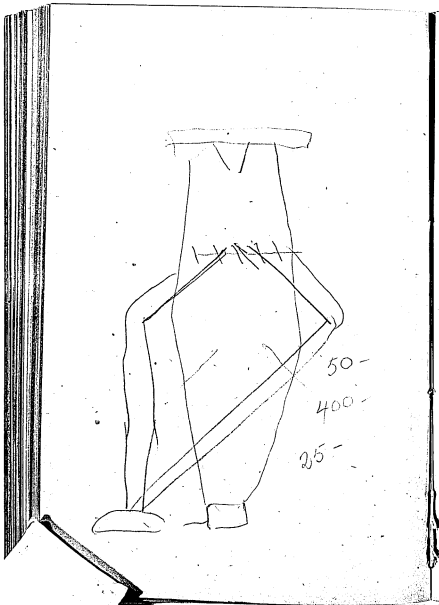
150

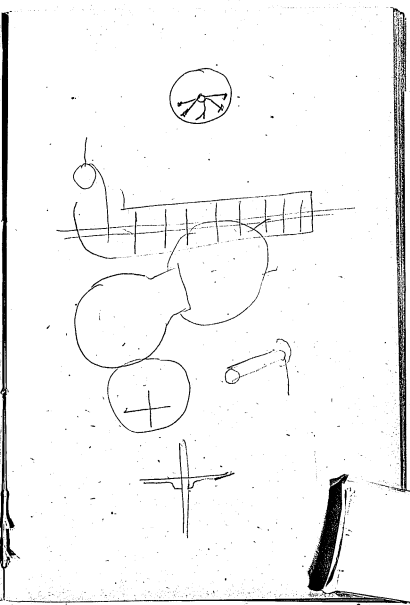
110

1454






50 -
400 -
25 -



80

10.03

16 $5.00

50-

7.-

100 03-

30-

12-

50 to

30

30-

20- 15000-

75

145

50

195-

100

295

125.000

17 $750

7500 175.000

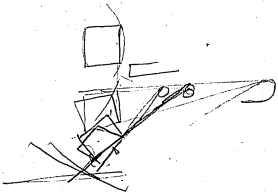
7500

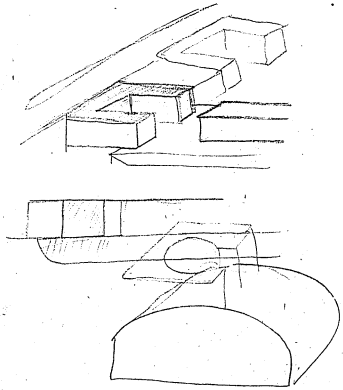
5007 75

175.60

9 trains

2 4 trains





2'

40

12

45

300

7'

30c

275

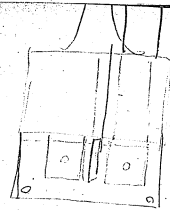
1500
333
4500
4500
4500
4995

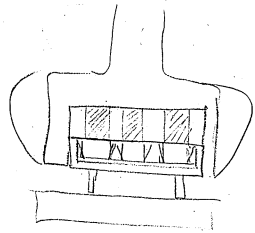
2400
12
4800
2400
2880
2

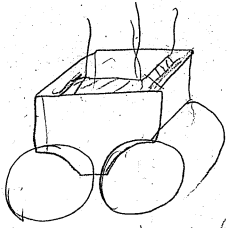
1728) 5760 (33.3
5184
5760
5184
5760

4995
60
2240) 299700 (129
2240
6570
4480
2090
2016
60

129 tons







187
600
112,200

75
40
3000

600

320) 60000 (187
320
2800
2560
240

3

129

90 180

320 inch beam
in can 60000 lbs
216 ft min surface Vil
or 187 lbs sq inch

40
8
320

300000 lbs

15

6 8

18
60
20

5200
20
104000
1800
7200
2200
2200

(1730

50

4

100 ft

100

8) 1730
216 ft

7.5
20
150

30 inches

216 ft

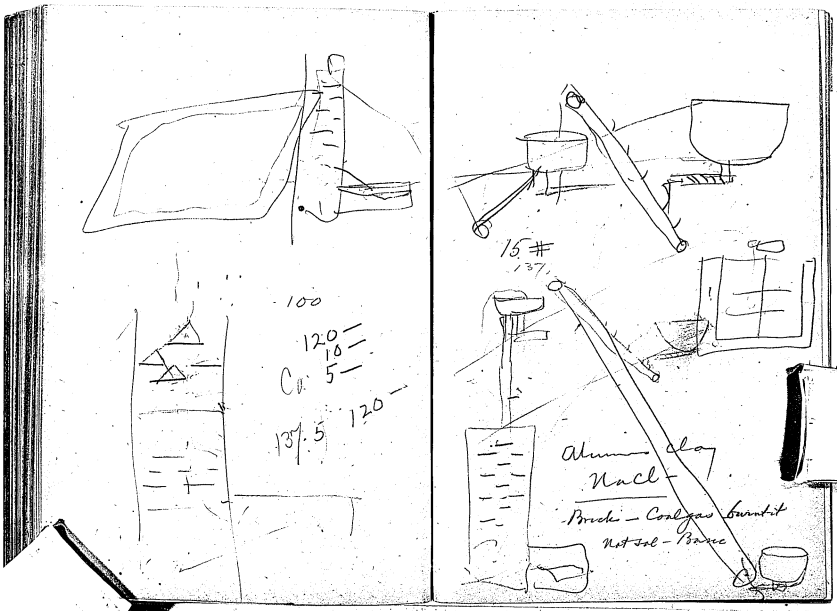
8) 60000
7500

7500

40) 16000 (lbs
400

400
40
1600

200 lbs sq inch


100
120
10
Cu 5
137.5
120
15 #
137
alum clay
Nacl
Brick – Coal gas burnt it
Not sol – Brace

3 lbs

700 - 1c

5 10 -

50 -

1/2 -

31
10
3 | 42
14 cents

78 | 3.522
58.
34
174
206

60.
120
67
5

tons

tons 12

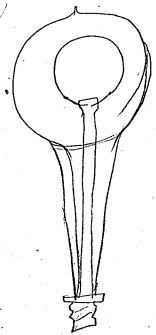
80 | 247
210

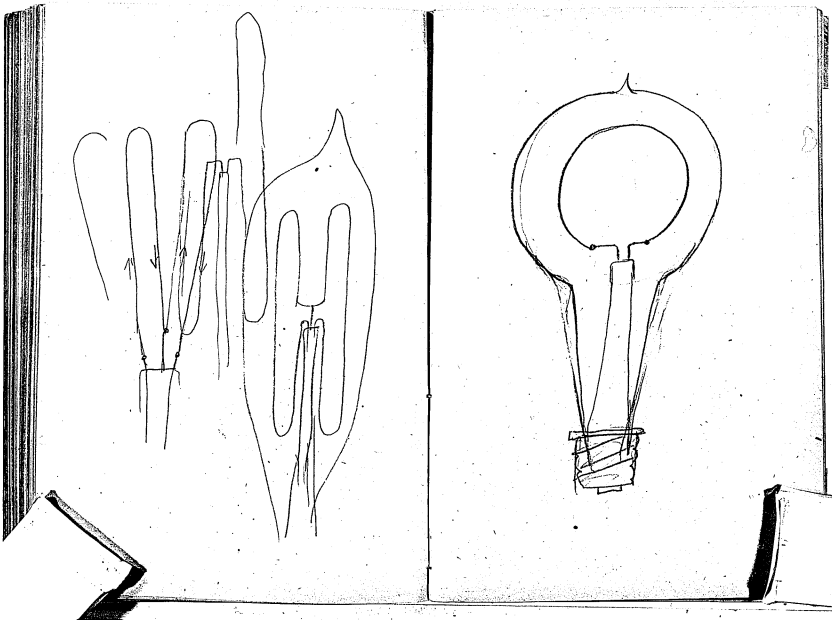
352 | 4200 | 1.49
352
800
352
3768
3168

tons

Portchester

70 | 247 | 352
210
370
350
200





if 400 ft gave 129 tons 41 hp & 23% effy
then one inch lotham.

Assuming 1 inch stream as the best thickness —
then the best results will be obtained by slowing the Rolls to 300 or thereabouts + increasing the pressure until the product gave 45% this would give say 90 tons -

It is probable that 200 feet per minute surface velocity - and a feed to give 1 inch thickness or 65 tons for 10" + the use of 20 inches or 130 tons + the use of 4 times the pressure will produce the best results

You half the speed you can double the feed double the pressure and the horse power will be just the same — but by you now have twice the pressure on each particle + a greater grinding slip — in addition —

If it took 40 hp for 129 tons 23% then it will take 80 hp to double the pressure to get 45 — this will narrow the stream to give but 100 tons — if you increase to 20 inch you get 200 ton but you must increase the pressure in proportion hence 200 tons 160 hp 45%

With any given roll

The thickness of the stream possible ~~is limited between~~ the roll has a limiting point, with a given pressure. The greater the pressure the sooner the limit —

Doubling Dia of the Roll or Keeping total pressure the same ~~doubling the time~~ the limit is twice as great, a thickness of stream is attained —

Or Slowing a 24 ~~in~~ Roll going ~~400~~ to 400 permits of doubling the ~~stream~~ thickness of stream

1 thick

129 tons 10 2240 / 2790 / 17280 / 10 (129

450 feet

150
31
150
4650
4650 (124

2790
2240
550
17280
2240
10 (3111
21
1728
3320

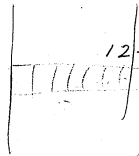
450
12
900
900
1150
54

129 —
100
80
75 —

100 —
125
150
175

150 —

350 —



12

1000
5000
5000000

14000

35
60
2100

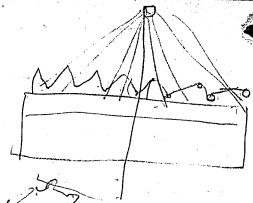
60
100
3000 3000 (7500
9900
64
60
60

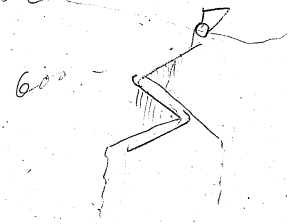
7000 / 12

2100000 (750
21000
1000

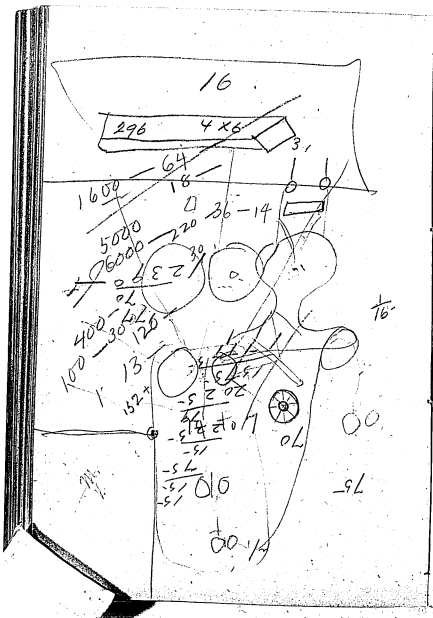
3000

7500 / 14000000 (1866.
7500
6500000
6000000
5000000
4500000
5000000

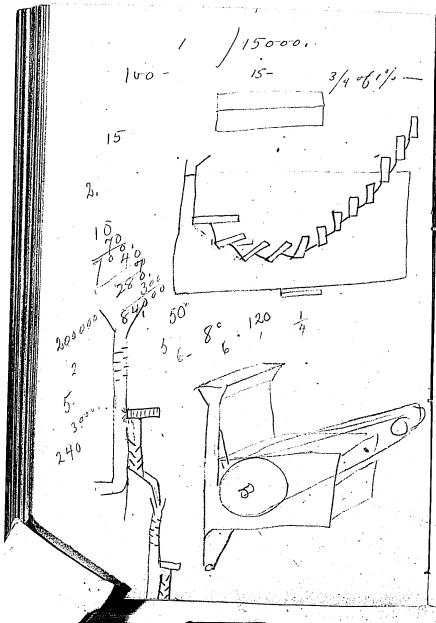


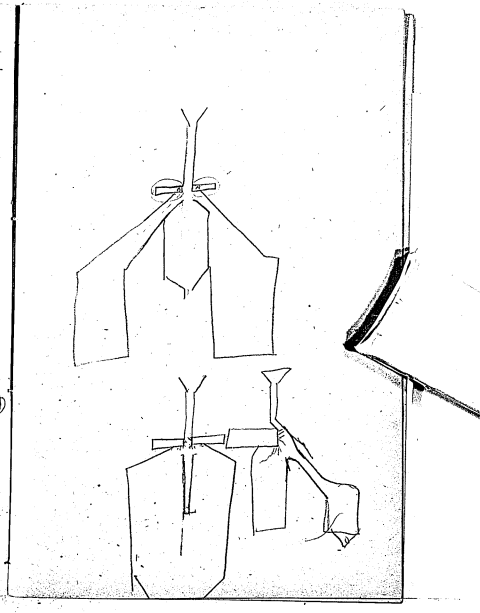


600



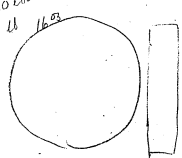
Mediagamma, 150 000
Humboldt - 150 000
Cliff -
Split Rock 200 000
Ft Cheatarella 50 000
Croton 350 000
Brewster 100 000
Pachoguc 40 000
Ft Kenny 125 000
Benanno 300 000
Monica 100 000
Ft Orum 25 000
Weldon 25 000
1,695,000
31

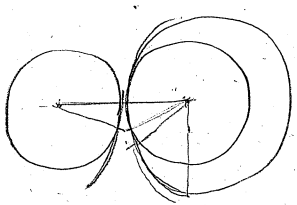

1
150000.
100 -
15 -
3/4 -61%
15
2.
10
70
60
40
20
30
50
200000
2
5.
3000
240
5
6 -
8°
6
120
1/4

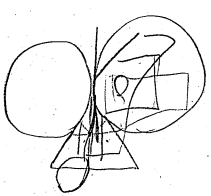


160
70) 560
560
40
245
700
Blood.
1600
360
1200
160
2240) 3600000
2240
3640
1360
1600

20 lbs Tap d water
1 lb 16 oz







5860 -
200 lb

3 -
9 -

2 -
180 -

13.900

1833
3
5.499

3.75 Cft Coke
1 Cubft briquette

12000 Cubft

2500 / 1200000 // 2526
9500
2500
2375
12500
9500
3000
2850

5480142 lb Coke
5005200 lbs briquette
2526 Cft briquette
9472 Cft Coke

2526
200
5052 00

2240) 5481 42 (244
4480
10071
8960
1111 5 42

375
55
300
187 5
2111

2240) 5005 200 (225
4480
5720
4480
1240 00

25 26
217
7682
2526
5052
5481 42

7620

3410

400 tons magore
500 tons anthracite.
900

2240) 8910 (4
8960
950

2526
375
0

310
4
1240 7682
1768
7578
9472 50

469

3410
1240
21.7

31
20
620

110
31
110
3300
341

Magnetite.

620
500
31 00
3100
3410

244 tons packed Coke
225 " " briquette.
2526 Cft briquette
9472 Cubft Coke

110

2240
620
1620
55
8100
8910

470 8910*

891

15 000 – Eng
22 000 Boilers –
3 000 – pumps –
3 000 Condenser
10 000 – Engine & Dynamo
6 000 piping –
10 000 Dynamos
7 000 Motors
20 000 Rolls –
25 000 Belt Screen
10 000 – Separators
50 000 Frame
20 000 Furnace water jacket
8 000 Dryer
25 000 Robolen
18 000 Buddles –
50 000 Bldg –
15 000 Lab
8 000 RR
10 000 Shops –
35 000 Belt Conveyors
30 000 Extras
419 000

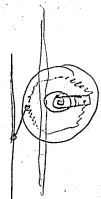
200
300
600 00

Buddles

25

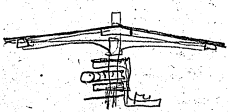
25
500
12500

500 000



240 / 15 000 / 4

2



mining 25
40 mule hire 25

Concrete Frac. 025
Drying 02
Rebates 10
Mosquitos 1
~~Screening~~ 3
~~Bundles~~ 5
Extra

2000 | 250 (2000
13
13
175
13
525
175
2275

75c

100 all Cost

10

2500

200

250
150

500 — 21000

24 | 2,500,000
00 hr
00
40

175
24
700
350
4200

52

lbs
24000
450
120000
96000
24 | 24000 (451,000 per hour

3 | 451000
20 | 15000 (750
140
100
100

750
200
500
500

75 tons

450 | 451,000 (1000
450

lbs 451000

40
240
120 long
150 across

451